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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/848,733	05/03/2001	Craig Uhrich	TWI-12410	8047

7590 02/27/2004

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EXAMINER	
STOCK JR, GORDON J	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 02/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/848,733	UHRICH ET AL.	
	Examiner	Art Unit	
	Gordon J Stock	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the limitation following processor, "for evaluating characteristics of the sample based on the generated output signals," of **claim 1** lacks antecedent basis; the limitation, "is less than 5mm in diameter," of **claims 2 and 19** lacks antecedent basis; the limitation following microns, "in diameter," of **claims 7, 8, 23, 24, 33 and 34** lacks antecedent basis; the limitation, "the processor operate to determine the change in polarization state of the radiation at a plurality of wavelengths to derive ellipsometric information," of **claim 17** lacks antecedent basis; the limitation, "generates output signals corresponding to a plurality of wavelengths simultaneously," of **claim 18** lacks antecedent basis; the limitations, "for monitoring a portion of the probe beam reflected from the sample and generating output signals responsive thereto" and "for evaluating characteristics of the sample based on the generated output signals," following "analyzer system" and "a processor" of **claim 19** lacks antecedent basis; the limitation, "the analyzer system and the processor operate to determine the change in polarization state of the radiation at a plurality of wavelengths to derive ellipsometric information," of **claim 30** lacks antecedent basis; the limitation, "the analyzer system generates output signals corresponding to a plurality of wavelengths simultaneously," of **claim 31** lacks antecedent basis; the limitations following analyzer system and processor comprising: "for monitoring a portion of the probe beam light reflected from the sample and generating output signals thereto, said output signals corresponding to a plurality of wavelengths simultaneously" and "for evaluating characteristics

of the sample based on the generated output signals" of **claim 33** lacks antecedent basis. Corrections are required.

Claim Objections

2. **Claims 14 and 28** are objected to for they read as if the optical system comprises five lenses. Examiner suggests including "said three lenses" in **claims 14 and 28**.

3. **Claim 38** is objected to for the following: "a refractive optical system" should read --all refractive optical system--.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1-12, 17-26, 30, 31, 33-35** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Norton (5,917,594)** in view of **Wagner (6,256,097)** and **Johs et al. (6,549,282)**.

As for **claim 1**, Norton in a spectroscopic measurement system discloses the following: a broadband light source having UV and visible wavelengths, a xenon arc lamp; an optical system including at least two lenses that are transparent to both UV and visible wavelengths and with refractive powers being selected to reduce chromatic aberration, zero power lens system; an analyzer system; a processor, a computer (Fig. 1; col. 4, lines 5-20; col. 6, lines 1-65). However, as for an all-refractive focusing optical system, Norton discloses that an all-refractive focusing optical system may be used; however, chromatic aberration would occur (col. 1, lines 20-40).

This suggests functional equivalents to transmissive versus reflective optics, if chromatic aberration did not occur with the all-refractive system. Wagner in an ellipsometer system also teaches the equivalence of transmissive versus reflective optics for focusing (col. 5, lines 20-26). In addition, Johs in an ellipsometry system teaches an all-refractive achromatic focusing system that has the same focal length at each wavelength in a spectroscopic range of wavelengths including deep UV comprising two lenses (col. 14, lines 55-65; col. 16, lines 1-10; Fig. $1a_2$). Thus, Norton discloses the claimed invention except that the system has transmissive and reflective focusing optics instead of all transmissive focusing optics, but Norton (col. 1, lines 20-40), Wagner, with Johs show that an all refractive focusing system is an equivalent structure known in the art because Johs has an all refractive focusing system that is achromatic. Therefore, because these two were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute an all-refractive focusing optical system for the transmissive partly reflective focusing system.

As for **claims 2-3**, Norton discloses the sample area being 40 by 40 microns (col. 6, lines 25-35), and the apodizer aperture has a diameter of 6mm (col. 7, lines 60-67), but the apodizer size and position of the apodizer may be changed to change the beam spot size (col. 8, lines 1-10). The size of the beam spot therefore is an optimized value. Norton discloses the claimed invention except for the beam spot being less than 3 or 5 mm in diameter. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to have the beam spot be less than 3 or 5 mm in diameter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d*

272, 205 USPQ 215 (CCPA 1980). In addition, Wagner teaches a beam spot of 10 microns or less (col. 5, lines 34-36).

As for **claims 4-5**, Norton discloses the lens system is zero power (col. 8, lines 10-65). And Johs states that the input lenses demonstrate essentially the same focal length at each wavelength in a range of wavelengths (col. 14, lines 55-65).

As for **claims 6-9**, Norton discloses an analyzer system a detector and an imaging system; the sample region being less than 100 microns in diameter and 60 microns in diameter, 40 by 40 microns; the imaging system includes an aperture between the sample and detector (col. 6, lines 5-40).

As for **claims 10-11**, probe beam spans at least 500 nm and 200nm to 800nm, preferably 190nm to 850nm (col. 7, lines 5-15).

As for **claim 12**, Norton discloses calcium fluoride and silica being the preferred materials of the lens (col. 8, lines 35-65)

As for **claims 17-18**, Norton discloses determining the change in polarization state of the radiation at a plurality of wavelengths and the analyzer generating output signals corresponding to a plurality of wavelengths simultaneously (col. 6, lines 5-35).

As for **claims 19-20**, Norton discloses the following: a broadband light source generating a polychromatic probe beam, said probe beam having UV and visible wavelengths having a range of at least 500nm; an optical system for focusing the probe beam onto a spot on the surface of the sample, said apodizer being 6mm in diameter; said optical system including at least two lenses that are transparent to both UV and visible wavelengths and with the refractive powers of the lenses being selected to reduce chromatic aberration of the optical system such that

the focal shift over the range of wavelengths is less than five percent of the mean focal length of the optical system, a zero power lens system; an analyzer system for monitoring a portion of the probe beam; a processor, a computer (Fig. 1; col. 4, lines 5-20; col. 6, lines 1-65; col. 7, lines 5-15; col. 8, lines 10-65). The apodizer size and position of the apodizer may be changed to change the beam spot size (col. 8, lines 1-10). The size of the beam spot therefore is an optimized value. Norton discloses the claimed invention except for the beam spot being less than 3mm or 5mm in diameter. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to have the beam spot be less than 3 or 5 mm in diameter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In addition, Wagner teaches a beam spot of 10 microns or less (col. 5, lines 34-36).

However, as for an all-refractive focusing optical system, Norton discloses that an all-refractive focusing optical system may be used; however, chromatic aberration would occur (col. 1, lines 20-40). This suggests functional equivalents to transmissive versus reflective optics, if chromatic aberration did not occur with the all-refractive system. Wagner in an ellipsometer system also teaches the equivalence of transmissive versus reflective optics for focusing (col. 5, lines 20-26). In addition, Johs in an ellipsometry system teaches an all-refractive achromatic focusing system that has the same focal length at each wavelength in a spectroscopic range of wavelengths including deep UV comprising two lenses (col. 14, lines 55-65; col. 16, lines 1-10; Fig. $1a_2$). Thus, Norton discloses the claimed invention except that the system has transmissive and reflective focusing optics instead of all transmissive focusing optics, but Norton (col. 1, lines 20-40), Wagner, with Johs show that an all refractive focusing system is an equivalent structure

known in the art because Johs has an all refractive focusing system that is achromatic. Therefore, because these two were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute an all-refractive focusing optical system for the transmissive partly reflective focusing system.

And Johs states that the input lenses demonstrate essentially the same focal length at each wavelength in a range of wavelengths (col. 14, lines 55-65).

As for **claim 21**, Norton discloses the lens system is zero power (col. 8, lines 10-65). And Johs states that the input lenses demonstrate essentially the same focal length at each wavelength in a range of wavelengths (col. 14, lines 55-65).

As for **claim 22**, Norton discloses a detector and imaging system (col. 6, lines 10-25).

As for **claims 23-24**, Norton teaches the area is 40 by 40 microns (col. 6, lines 25-35).

As for **claim 25**, Norton discloses an aperture between the sample and detector (col. 6, lines 15-20).

As for **claim 26**, Norton discloses the beam spanning 200nm to 800nm (col. 7, lines 8-11).

As for **claims 30-31**, Norton discloses determining the change in polarization state at a plurality of wavelengths (col. 6, lines 5-35).

As for **claim 33**, Norton discloses: a broadband light source having uv and visible wavelengths having a range of at least 500nm and including 200nm; an optical system for focusing the beam onto a spot on the surface of the sample; apodizer having a diameter of 6mm; said optical system that may include more than two lenses consisting of calcium fluoride and fused silica and with the refractive powers of the lenses being selected to reduce chromatic

aberration of the optical system such that the focal shift over the range of wavelengths is less than five percent of the mean focal length of the optical system; an analyzer system including a detector; an imaging system including an aperture; area of sample imaged is less than 100 microns in diameter; a processor, a computer (Fig. 1; col. 4, lines 5-20; col. 6, lines 1-65; col. 7, lines 5-15; col. 8, lines 10-65; col. 9, lines 5-25). The apodizer size and position of the apodizer may be changed to change the beam spot size (col. 8, lines 1-10). The size of the beam spot therefore is an optimized value. Norton discloses the claimed invention except for the beam spot being less than 3mm in diameter. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to have the beam spot be less than 3 mm in diameter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In addition, Wagner teaches a beam spot of 10 microns or less (col. 5, lines 34-36).

However, as for an all-refractive focusing optical system, Norton discloses that an all-refractive focusing optical system may be used; however, chromatic aberration would occur (col. 1, lines 20-40). This suggests functional equivalents to transmissive versus reflective optics, if chromatic aberration did not occur with the all-refractive system. Wagner in an ellipsometer system also teaches the equivalence of transmissive versus reflective optics for focusing (col. 5, lines 20-26). In addition, Johs in an ellipsometry system teaches an all-refractive achromatic focusing system that has the same focal length at each wavelength in a spectroscopic range of wavelengths including deep UV comprising two lenses (col. 14, lines 55-65; col. 16, lines 1-10; Fig. $1a_2$). Thus, Norton discloses the claimed invention except that the system has transmissive and reflective focusing optics instead of all transmissive focusing optics, but Norton (col. 1, lines

20-40), Wagner, with Johs show that an all refractive focusing system is an equivalent structure known in the art because Johs has an all refractive focusing system that is achromatic. Therefore, because these two were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute an all-refractive focusing optical system for the transmissive partly reflective focusing system. And Johs states that the input lenses demonstrate essentially the same focal length at each wavelength in a range of wavelengths (col. 14, lines 55-65).

As for **claim 34**, Norton discloses the area on the sample is 40 by 40 microns (col. 6, lines 26-30).

As for **claim 35**, Norton discloses the probe beam spans 190nm to 850nm preferably (col. 7, lines 9-11).

6. **Claims 13, 14, 27, 28, and 38** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Norton (5,917,594)** in view of **Wagner (6,256,097)** and **Johs et al. (6,549,282)** and further in view of **Maruyama (6,101,035)**.

As for **claims 13-14**, Norton discloses that more than two lenses may be used (col. 9, lines 5-25). Wagner also teaches that the focusing optic may be more than one element (col. 5, lines 24-26). In addition, Maruyama teaches in a triplet lens system a triplet lens system that suppresses astigmatism and curvature of field and is substantially achromatic (col. 1, lines 30-35; Figs. 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, and 18c). Therefore, it would be obvious to one skilled in the art at the time the invention was made to substitute triplet lens system for the transmissive and reflective system of Norton's, for the triplet lens system is an art recognized equivalent with Norton's focusing system, for it corrects for astigmatism and other aberrations.

As for **claim 27-28**, Norton discloses the system may include more than two lenses (col. 9, lines 5-20) and that they may be made of calcium fluoride and fused silica, preferred materials (col. 8, lines 35-65). In addition, Wagner teaches that one or more elements may be used as a focusing optic (col. 5, lines 25-26). In addition, Maruyama teaches in a triplet lens system a triplet lens system that suppresses astigmatism and curvature of field and is substantially achromatic (col. 1, lines 30-35; Figs. 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, and 18c). Therefore, it would be obvious to one skilled in the art at the time the invention was made to substitute triplet lens system for the transmissive and reflective system of Norton's, for the triplet lens system is an art recognized equivalent with Norton's focusing system, for it corrects for astigmatism and other aberrations.

As for **claim 38**, Norton in view of Wagner and Johs discloses everything as above (see claim 33). Norton discloses the system may include more than two lenses (col. 9, lines 5-20) and that they may be made of calcium fluoride and fused silica, preferred materials (col. 8, lines 35-65). In addition, Wagner teaches that one or more elements may be used as a focusing optic (col. 5, lines 25-26). In addition, Maruyama teaches in a triplet lens system a triplet lens system that suppresses astigmatism and curvature of field and is substantially achromatic (col. 1, lines 30-35; Figs. 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, and 18c). Therefore, it would be obvious to one skilled in the art at the time the invention was made to substitute triplet lens system for the transmissive and reflective system of Norton's, for the triplet lens system is an art recognized equivalent with Norton's focusing system, for it corrects for astigmatism and other aberrations.

7. **Claims 15, 32, and 37** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Norton (5,917,594)** in view of **Wagner (6,256,097)** and **Johs et al. (6,549,282)** and further

in view of **Appius (DE 3635637 A1)**.

As for **claims 15, 32, and 37**, Norton in view of Wagner and Johs discloses everything as above (see **claims 1, 19, and 33** above). However, they are silent concerning a lens mount. The Examiner takes official notice that a lens mount is well known in the art for providing support for a lens. In addition, Appius in a mounting device for a lens system comprising a plurality of lenses teaches the mount provides the lens a stress free environ (abstract). Therefore, it would be obvious to one skilled in the art at the time the invention was made to have the lenses be in a mount in order to remove stress to the lens assembly.

8. **Claims 16, 29, and 36** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Norton (5,917,594)** in view of **Wagner (6,256,097)** and **Johs et al. (6,549,282)** and further in view of **Nagano (5,798,876)**.

As for **claims 16, 29, and 36**, Norton in view of Wagner and Johs discloses everything as above (see **claims 1, 19, and 33** above). Norton also discloses a polarizer (col. 6, lines 6-9). He is silent concerning alignment in light of stresses. However, Nagano in lens system teaches aligning the lenses in order to have contact forces in the direction of the optical axis to prevent concentration of stress on the lenses (col. 27, lines 25-45). Therefore, it would be obvious to one skilled in the art to align the lenses such that forces are aligned in the direction of the optical axis in order to prevent concentration of stress on the lenses.

Response to Arguments

9. Applicant's arguments (Remarks pages 10-12 of November 24, 2003) with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. However, Examiner agrees with argument that Norton does not have an all-refractive focusing optical

system because of the mirror and that his system teaches away from refractive objectives (col. 1, lines 33-35 of Norton). However, Norton's statement implies that an improvement upon refractive objectives rendering them achromatic would make them functionally equivalent to his focusing system. In addition, in view of Wagner transmissive and reflective systems are equivalent as focusing optics (col. 5, lines 20-30 of Wagner). And Maruyama triplet lens system suppresses astigmatism and other aberrations (col. 1, lines 30-35; see even numbered Figures). And Johs discloses in an ellipsometer system a quasi-achromatic focusing system comprising two lenses (col. 16, lines 1-10 of Johs). Therefore, the lens systems of Johs and Maruyama are substantially achromatic; thereby, functionally equivalent to Norton's focusing system.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

11. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: **(703) 872-9306**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431. The examiner can normally be reached on Monday-Friday, 8:00 a.m. - 4:30 p.m.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

gs
January 30, 2004

Zandra V. Smith
Primary Examiner
Art Unit 2877